

## **REMARKS**

The Office Action mailed February 12, 2008, has been received and carefully considered. The Title has been amended to reflect the subject matter of the pending claims. Claims 1, 3, and 8-13 have been amended, and new claims 16-23 have been added. To the best of the undersigned attorney's information and belief, these changes contain no new matter for the reasons given in the remarks which follow.

**Claims 1-3, 8-13, and 16-23 are now pending in the Application and are submitted to be in allowable condition.** Claims 1 and 16 are independent.

### **Claim Changes and Support**

Claim 1 has been amended to recite, "*A fuel supplying apparatus for a fuel cell, comprising: a fuel; and a cross-linked membrane for encapsulating the fuel and isolating the fuel from a fuel solvent in the fuel cell, wherein the cross-linked membrane is permeable only to the fuel.*"

Support for "a cross-linked membrane for encapsulating the fuel", is found in the Application on page 5, lines 9 and 10, see also paragraph [0013] of the published Application.

Support for new independent claim 16 is found in claims 1 and 3.

Support for new claims 17-23 is found, respectively in claims 2 and 8-13.

**1. The rejection of claims 1-3 and 8-13 under 35 USC §112, first paragraph, is submitted overcome by the amendments made herein to independent claim 1.** Claim 1 has been amended to specify, "A fuel supplying apparatus for a fuel cell ...".

**II. The rejection of claims 1-3, 12, and 13 under 35 USC §112, first paragraph, is submitted overcome by the amendments made herein to claim 1.**

Claim 1 has been amended to specify, "a cross-linked membrane".

**III. The rejection of claim 3 under 35 USC §112, first paragraph, is submitted overcome by the amendments made herein to claim 3.** Claim 3 has been amended to specify, "wherein the fuel and the cross-linked membrane are formed to have has a gel-like structure".

**IV. The rejection of claims 9-13 under 35 USC §112, second paragraph, is submitted overcome by the formal amendments made herein to claims 9-13.**

**V. The rejection of claims 1, 2, and 8 under 35 U.S.C. §102(e) as anticipated by Prasad et al. (US 6,924,054) is respectfully traversed.**

The Examiner relies on the Abstract, and Col. 2, line 48, through Col. 6, line 30, and claim 29 of Prasad as teaching a cross-linked polymer that holds the fuel methanol.

**Applicant respectfully disagrees that the disclosure of Prasad et al. when read as a whole anticipates the present invention.**

The present invention relates to a fuel supplying apparatus for a fuel cell, comprising a fuel and a cross-linked membrane for encapsulating the fuel and isolating the fuel from a fuel solvent in the fuel cell, wherein the cross-linked membrane is permeable only to the fuel (see claim 1). The fuel is methanol (see claim 2). The cross-linked membrane is a single-layered cross-linked membrane allowing the fuel to permeate in one direction (see claim 8).

As stated in paragraph [0006] of Applicant's published Application, the fuel supplying apparatus controls rate of fuel release via its material characteristics and, thus, is capable of maintaining the fuel concentration in the fuel tank of the fuel cell so as to prevent an inappropriate fuel concentration from affecting operation performances. The apparatus disclosed in Prasad et al. is submitted to be substantially different from that of the present invention so that the advantages of the present

invention would not be obtained by the apparatus of Prasad et al.

1. Col. 7, lines 9-12, of Prasad et al. state, *"In the embodiment depicted in Figs. 2-4, fuel supply 20 includes a pressurizer 80 in the form of a spring 82 that pushes against the outside of first flexible inner container 42 to compress the first flexible inner container"*. Thus, the Examiner seems to consider that pressurizer 80 of Prasad et al. corresponds to the fuel supplying apparatus of the present invention. However, the pressurizer 80 of Prasad et al. is distinguishable in that it is used for storing waste solution and is not a fuel supplying apparatus according to the present invention.

2. Further, the super-absorbent material in the waste storage area 26 of Prasad et al. prevents waste from leaking out of waste inlet 30 (see column 6, lines 13-30, of Prasad et al.). In contrast, the cross-linked membrane of the present invention selectively allows the encapsulated fuel, but not other solvents in the fuel tank, to permeate through the membrane (see page 5, lines 8 and 9 of the Application).

3. Moreover, Prasad et al. show in FIG. 4 that pressurizer 80 still has an opening that is not completely closed. In view of this, Applicant respectfully submits that it is clear that the present invention recited in independent claim 1 is different from that of Prasad et al.

4. In the present invention, the cross-linked membrane is provided as a one-way gate for releasing fuel to the fuel tank (see claim 1). In Prasad et al. Figs. 10 and 11, the first flexible inner container 142 formed by an exchange membrane for fuel storage releases fuel through the fuel inlet 128. Therefore, the feature of "allowing the encapsulated fuel in the fuel tank to permeate in one direction" of the present invention is not taught by Prasad et al.

5. Further, the fuel supplying apparatus for a fuel cell according to the present invention uses the polymer to control the rate of release of the fuel. However, Prasad et al. Figs. 13 and 14, and page 9, line 62, to page 11, line 23, disclose that controller 370 receives input from one or more sensors that monitor the performance of fuel cell

350 and adjusts the rate of transfer of fuel solution to catalyst 340 in response to the input. In other words, the fuel supply of Prasad uses a controller to control rate of transfer of fuel. The present invention is distinguishable in that no additional devices or tubes are required so that the present invention provides a fuel supplying apparatus for a fuel cell at a lower cost and with operating efficiency.

6. The Examiner appears to consider that Prasad et al. disclose that the cross-linked membrane is a cross-linked polymer that holds the fuel methanol. However, the cross-linked membrane of the present invention is only permeable to the fuel (see claim 1). Applicant submits that the disclosure of Prasad et al. is not seen to teach or suggest a membrane allowing encapsulated methanol, but not water, to permeate through the membrane.

In view of the distinctions in (1) – (6) above, the disclosure of Prasad et al. does not anticipate the present invention as claimed in claims 1, 2, and 8 so that this ground of rejection should be withdrawn.

**VI. The rejection of claim 9 under 35 U.S.C. §103(a) as obvious in view of Prasad et al. (US 6,924,054) is respectfully traversed.**

The Examiner acknowledges that the disclosure of Prasad et al. does not teach the particular polymer is cross-linked, e.g., polyvinylpyrrolidone (Col. 6, line 24). The Examiner, however, points to Col. 6, lines 20 and 21, of Prasad et al. as providing for a cross-linked polymer, e.g., cross-linked polyacrylic acid, etc. so that the membrane could be a polymer formed to be cross-linked.

**Applicant respectfully disagrees that the disclosure of Prasad et al. when read as a whole renders obvious the present invention.**

The present invention according to claim 9 as amended specifies that the single-layered cross-linked membrane is selected from the group consisting of polyvinyl acetate, oligomers and copolymers of vinyl pyrrolidone, and polytetrafluoroethylene.

6. While the Examiner considers that Prasad et al. disclose that the cross-linked membrane is a cross-linked polymer that holds the fuel methanol, Applicant submits that the cross-linked membrane of the present invention is only permeable to the fuel (see claim 1). Applicant therefore respectfully submits that the disclosure of Prasad et al. read as a whole is not seen to teach or suggest a cross-linked membrane allowing encapsulated fuel, e.g., methanol, but not a fuel solvent, e.g., water, to permeate through the cross-linked membrane.

7. Moreover, the disclosure of Prasad et al. does not teach or suggest that the cross-linked membrane is selected from the group consisting of polyvinyl acetate, oligomers and copolymers of vinyl pyrrolidone, and polytetrafluoroethylene.

In view of (1) – (5) above, and the additional distinctions set out in (6) and (7) above, Applicant submits that the disclosure of Prasad et al. may not be fairly said to meet claim 9 as amended so that no *prima facie* case of obviousness has been made out and this ground of rejection should be withdrawn as well.

## **CONCLUSION**

In view of the foregoing amendments and remarks, Applicants submit that claims 1-3, 8-13, and 16-23, and the Application are in condition for allowance. Reconsideration and passage of this case to issue are therefore requested.

Should the Examiner consider that a conference would help to expedite the prosecution of this Application, the Examiner is invited to contact the undersigned to arrange for such an interview.

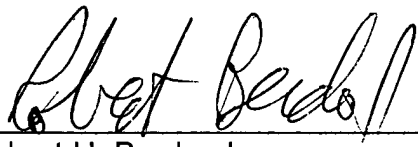
No additional claim fee is believed due for the addition of new claims 16-23. Should an additional claim fee be deemed due, the Commissioner is hereby authorized to charge the fee to our Deposit Account No. 18-0002 and is requested to advise us accordingly.

Request For Extension of Time

Applicant requests a second extension of time for responding to the Office Action dated February 12, 2008. A second extension fee of \$460.00 is now due. This fee is submitted herewith in the attached credit card form PTO-2038. Should the remittance be accidentally missing or insufficient, the Commissioner is hereby authorized to charge the fee to our Deposit Account No. 18-0002 and is requested to advise us accordingly.

Respectfully submitted,

July 10, 2008  
Date

  
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